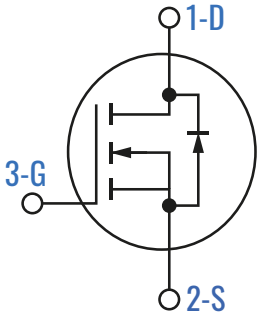
SMF404
1000V N-Channel Power MOSFET - 1

KEY FEATURES

- I_D 15A
- $R_{DS(on)}$ 760mΩ
- FAST RECOVERY DIODE
- AVALANCHE RATED
- TO-258 HERMETIC PACKAGE
- BACKSIDE ISOLATION
- JANTX, JANTXV SCREENING AVAILABLE



ORDERING GUIDE

Part Number SMF404

Description 1000V N-Channel Power MOSFET

ABSOLUTE MAXIMUM RATINGS (T_C = 25°C unless otherwise specified)

PARAMETER	SYMBOL	VALUE	TEST CONDITIONS
Drain-Source Voltage	V_{DSmax}	1000V	V_{GS} = 0V, I_D = 100µA
Gate-Source Voltage (dynamic)	V_{GSM}	±30V	Transient
Gate-Source Voltage	V_{GSS}	±20V	Continuous
Drain Current, continous	I_{D25}	15A	T_C = 25°C
Drain Current, pulsed	$I_{D(PULSE)}$	40A	Pulse width T_p limited by T_{Jmax}
Power Dissipation	P_D	280W	T_C = 25°C
Junction Temperature Range, Operating Junction Temperature Range, Storage	T_J T_{STG}	-55°C to 150°C	

ELECTRICAL SPECIFICATIONS (T_J = 25°C unless otherwise noted)

Parameter		Symbol	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 1mA	$V_{(BR)DSS}$	1000			V
Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 1mA, T_J = 25°C	$V_{GS(th)}$	3.5		6.5	V
Off -State Drain Current	V_{DS} = 1000V, V_{GS} = 0V, T_J = 25°C	I_{DSS}			25	µA
	V_{DS} = 1000V, V_{GS} = 0V, T_J = 125°C				1	mA
Gate-Source Leakage Current	V_{GS} = ±20V, V_{DS} = 0V	I_{GSS}			±100	nA
Drain-Source On-state Resistance	V_{GS} = >20V, I_D = 7.5A, T_J = 25°C	$R_{DS(on)}$		760	900	mΩ
Transconductance	V_{DS} = >20V, I_D = 7.5A, T_J = 25°C	G_{fs}	6.5	8.5		S
Input Capacitance Output Capacitance Reverse Transfer Capacitance	V_{GS} = 0V, V_{DS} = 25V, f = 100kHz	C_{iss} C_{oss} C_{rss}		5140 322 43		pF
Total Gate Charge Gate to Source Charge Gate to Drain Charge	V_{GS} = 10V, V_{DS} = 0.5 x V_{DSS}, I_{DS} = 0.5 x I_{D25}	$Q_{g(on)}$ Q_{gs} Q_{gd}		97 38 42		nC
Turn On Delay Time Rx Time Turn Off Delay Time Fail Time	V_{GS} = 10V, V_{DS} = 0.5 x V_{DSS}, I_{DS} = 7.5 x I_{D25}, R_G = 2Ω (external)	$t_{d(on)}$ t_r $t_{d(off)}$ t_f		41 44 44 58		ns
Thermal Resistance		R_{thJC}			0.445	°C/W

BODY DIODE CHARACTERISTICS (T_J = 25°C unless otherwise noted)

Parameter		Symbol	Min.	Typ.	Max.	Unit
Body Diode Forward Voltage	I_F = I_S, V_{GS} = 0V, T_J = 25°C	V_{SD}			1.5	V
Body Diode Reverse Recovery Time	V_r = 100V, V_{GS} = 0V, I_D = 7.5A, di/dt = 100A/µs	T_{rr}			500	ns
Body Diode Reverse Recovery Charge	I_F = 28A, di/dt = 100A/µs, V_R = 100V	Q_{RM}		0.6		nC
Source to Drain Diode Current, cont.	V_{GS} = 0V	I_S			15	A
Pulse Diode Forward Current	Repetitive, pulse width limited by T_{JM}	I_{SM}			60	A

TYPICAL PERFORMANCE

Fig. 1 Maximum Power Dissipation vs.Case Temperature

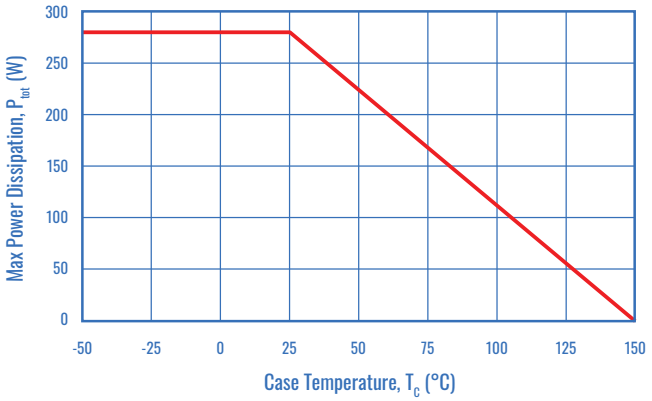


Figure 2. MOSFET Junction to case Transient Thermal Impedance, Zth J_C (°C/W)

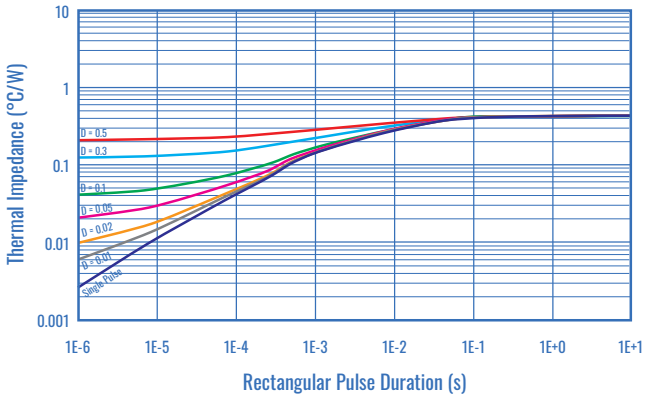
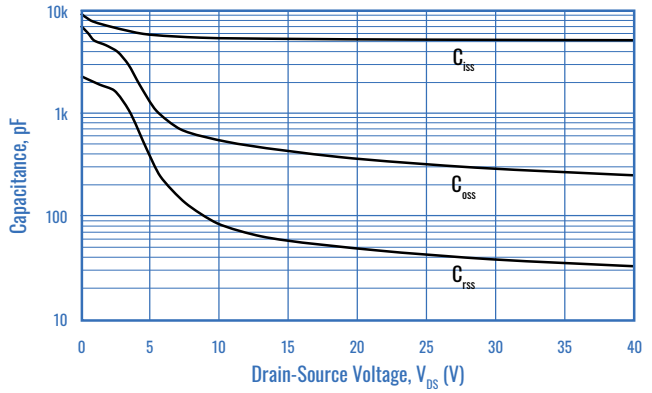
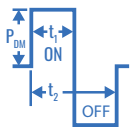


Figure 3. Capacitance vs Drain-Source Voltage

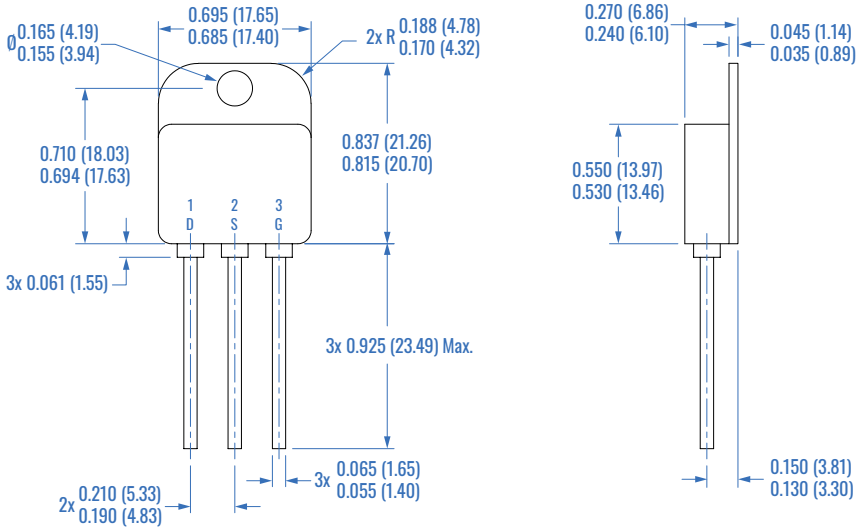


$T_{J(Pk)} = (P_{DM} P x Z_{thJC}) + Z_C$



Duty Factor D = t_1/t_2

OUTLINE DIMENSION



All dimensions in inches (mm) maximum minimum

SCHEMATIC